Transaction Costs, Convergence and Gains from Trade: Evidence from Japan

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Abstract

Transaction costs are among the most important explanatory variables for institutional economics. Starting from Ronald Coase as the pioneer then North, Wallis, Williamson and many other economists have been pointing to this. Institutional quality can be measured by the rule of law index and government effectiveness; however, the impacts on the economy as spillover effects are the other crucial points which needed to be studied. Besides these, how are these transaction costs created? What kind of sources are they coming from? In order to explain these questions, understanding institutional change is vital. Yet, this may not be enough to explain where this institutional change is coming from. Are countries experiencing modernization and if so, how? Do countries affect each other so that they are becoming similar? What is the cost of this unity? How will this unity be achieved by these countries? To answer these additional questions, one should start from international trade. The neoclassical international trade theory suggests that countries converge on each other as they trade goods and services. Also, as trade volume increases, we expect to have more consumption and production and some other benefits which lead to an increase in the utility level of representative households. The rate of convergence depends on countries' bargaining power. Therefore, countries force their trade partners to cause institutional changes. According to the Walrasian world, transaction costs are assumed to be zero since we have perfect markets. However, in the real world we have uncertainty, and information is not costless. Thus, people encounter these transaction costs as stated by Coase and many others. All in all, considering trade, institutional change and transaction costs together will provide the net benefits from trade. As evidenced by Japan, the path

of institutional change is coming from Western influences. These influences started in Japan increasing the international trade volume in the Meiji Era. Consequently, the main purpose of this dissertation is to bring together all the crucial points stated above, and then find the net gains from trade. This unique idea fills the gap in the literature.

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Chapter 1

Introduction and Research Question

1.1 Introduction

Trade is one of the most important sections in the national economy. Simply put, GDP includes consumption, investment, government expenditure and net exports. From this perspective, the importance of trade is obvious. According to the neoclassical world, countries trade goods and services in order to produce more, consume more, have lower prices, obtain higher quality products and have different products. Samuelson, Bhagwati and many other economists suggest that free trade is better than no trade, or at least some trade is better than no trade. From this perspective, we expect to have an increase in our utility level as we trade more and more. However, in the literature, something is missing. Bargaining power should be considered. Do all countries get the same benefits from trade? Or is this calculation efficient? To answer these questions, this dissertation aims to show net benefits from trade with all sides such as gains and costs. In a simple exchange process, partners influence each other, and this influence is unavoidable. From this point, countries influence each other before, during and after trade as well. Depending on their political and economic power, these gains from trade will not be distributed evenly among partners. In this case, institutional change is playing the crucial role. Neoclassical theory suggests that countries converge as they trade. Therefore, trading partners force each other to change their institutions. To trade with partners, countries would have to change their institutions from informal/traditional

situations to formal situations. In this dissertation, change in institutions and how institutional qualities are affected will not be studied. This is outside of the scope. However, change in institutions is not costless. Countries would have some costs as a result of institutional changes which are called transaction costs. According to North (1990), transaction costs are the most important dimensions for institutions. Therefore, once institutions are considered, one should measure their quantitative impacts on the economy as transaction costs. To sum up, when trade, convergence and institutional changes are considered together, the net gains from trade will be different from how they are calculated so far. This is the focus of this dissertation: to have net welfare analysis for representative households from trade, considering institutional changes and their impacts.

1.2 International Trade

Carbaugh (2011) states that the importance of international trade is coming from history. Starting from *Mercantilists*, then followed by classical economists - *Adam Smith, David Ricardo, and John Stuart Mill*, the trade theory has been improving till now. According to mercantilists, the world has a fixed wealth so that if one nation gets benefits from trade then the other trading partner losses. This is the static view of trade. However, according to Adam Smith (1776), the world is not static, but dynamic, so that when countries trade with each other with specialization and division of labor, then world welfare will increase. David Ricardo (1817) modifies Adam Smith's ideas and concludes that after trade world output increases, consumption will increase. This is the trade theory which is coming from the past to the present, as always with improvements.

1.2.1 Summary of International Trade Theory

Being rational people, we aim to reach the two most important cases: profit maximization and/or cost minimization – as producers and utility (benefit) maximization – and/or cost minimization as consumers given limited sources. Meade (1966) states the marginal conditions for *Utopian Efficiency* to explain that economic resources including land, labor, capital and adding one more,

which is technology, should be used efficiently when it is impossible to make one citizen better off without making any other citizens worse off. In order to briefly look at these conditions which are given by him:

- Optimum trade condition,
- Product maximization,
- Product optimization,
- Effort optimization,
- Distribution optimization,
- Population and saving optimization.

According to him, these conditions are necessary for economic welfare. In order to reach the efficient economic welfare, marginal adjustments play critical roles. In his book, he tries to minimize or eliminate the differences between marginal social values and costs. From his point of view, one may still change the economic welfare even by having these necessary conditions through structural economic change, which is discussed in the section 1.3.

When we ask why nations would like to trade, the answer is obvious. Countries have both absolute and comparative advantages according to Adam Smith and David Ricardo. Briefly summarizing the absolute advantage, Adam Smith (1776) suggests that countries should produce and export the goods in which they have the absolute advantage -lower cost- hence becoming more competitive than their trading partners. David Ricardo (1817) modifies this theory that countries should specialize in the production and export of goods even though they do not have absolute advantage but having a comparative advantage -lowest opportunity cost, therefore being more competitive than their trading partners for the goods which have the lowest opportunity cost.

1.2.2 Types of Gains From Trade

In this section, types of gains from trade will be discussed from the international trade theory starting with mercantilists. This plays one of the critical roles in this work. Gains from trade should be for every single nation. Because of trade, even though world output and consumption will increase according to D. Ricardo, individual nations should be taken care of depending on their bargaining powers, trade unions, institutional changes, etc. In this work, mainly institutional changes will be stressed as the result of trade with countries and their bargaining power. Bhagwati, Panagariya, and Srinivasan (1998) point out the basic theorem of gains from trade. According to them, if one counts price, then *free trade is better than no trade*, but if one does not take prices, then *some trade is better than no trade*. In the second case, they take care of utility changes before and after trade and suggest that we need to make someone better off without making anybody worse off. This sticks with the *Utopian Efficiency* by J. Meade. In this work, depending on the data availability, which is discussed in chapter 3, trade volume and average consumption expenditure/change in consumption expenditure, will be calculated for selected years in Japan as a whole country and as being from different representative households. In literature, we have important types of gains from trade as follows;

In literature, we have important types of gains from trade are followings;

- Consumption Gains,
- Production Gains,
- Lower Price,
- Better/Higher Quality,
- Varieties in Production.

As stated above, in this work, to measure welfare gains from international trade -in the view of institutional change and its impacts as transaction costs- consumption gains will be studied as well

as how people's consumption expenditure is changing because of changes in trade volume in Japan. Methodology is discussed in chapter 3.

1.3 Institutions

The role of institutions in economic performance has been gaining importance for the last half century. The work of Coase, Hurwicz, North, and many others is noting this importance. Hurwicz (1996) states that institutions are humanly devised constraints which shape human interaction. It includes rules plus regularities. North (1990) also stresses Hurwicz's definitions and concludes that institutions create political, economic and social incentives. As stated by Hurwicz for institutions as constraints, it would be both formal and informal constraints. North points out that starting from early history, without having institutions and organizations, the informal constraints -including taboos, rituals, and behaviors- were important, and formal constraints -such as rules and regulations- are acquiring importance after institutional frameworks were built up. According to him, institutional frameworks include legal rules, organizational forms, enforcement and norms of behavior. Thus, this framework creates the structure for the exchange.

1.3.1 Historical Way of Institutional Change

The path of institutional change provides a convergency between countries as they trade. According to neoclassical international trade theory, North (1990) states that countries will gradually converge as they trade goods and services. This convergence will happen between any type of countries, especially between developed and developing countries. This institutional change happens overnight as a formal change, and takes time as an informal change due to the change in cultures, traditions, norms, taboos, etc. The informal change shows the historical path of institutional change. North also shows the difference between personal and impersonal exchanges in terms of costs. In the personal exchange, transaction costs are low because of cultural homogeneity and the lack of third party enforcement, whereas in the impersonal exchange, transaction costs

are high since both parties are constrained by some rules, and third-party enforcement captures some gains as transaction costs. As stated above, since transaction costs are the most observable dimensions of institutions and institutional change, having institutional frameworks would capture gains from trade or exchange by contract enforcement, property rights, and court costs. These are discussed thoroughly in the next section.

1.3.2 Institutional Change in Japan

In this section, institutional change in Japan is discussed in view of both the historical perspective, particularly the *Meiji Era*, and the recent period.

Meiji Era (1868-1912)

Starting from 1850s -the end of *Tokugawa period*- international trade and its results as being the Western influence had been increasing. International trade in Japan started during the period that shows the relationship between Japan and the rest of the world. However, in this dissertation, the historical data was taken from 1880 to get the most balanced data set between variables.

Lockwood (1968) states that the decay of *feudalism* started from the Meiji Era in the form of changes in business class and political power to representatives of people. In Henshall's (1999) book he talks about *unequal treaties* and about trade during the last decades of the Tokugawa period and the early Meiji Era which resulted in losing control of trade by the Japanese. Therefore, Western influence on Japan was then historically started and proven.

Changes in institutions in Japan in the classical period was inevitable because of Western influence. Japan as a country has had several key changes in not only economic life but also in social life including[1];

- Restriction on property rights was abolished.

[1] Source: Lockwood (1968)

- New fiscal systems were created.
- Banks and insurance were created.
- Service sectors were created.
- There was an improvement of manufactured sectors.

These are some of the major changes during those years in Japan. Economically, they seemed to create efficiency and growth; however, they caused the creation of transaction costs for the entire economy and society which needs to be considered deeply.

Vital Changes in Meiji Framework (1868-1912)[2]

It can be seen below that convergency to the Western Style happened both in governmental organizations and the economic society.

By foreigners -mainly by British people.

Influences on	**Change in Service Activities**
Improvements in Science and Technology	Import Requirements
Change in Political Institutions	Shipping
Change in Economic Organizations	Banking
Increase in number of Foreign Experts	Commercial Services
Increase in number of Foreign Merchants	Property Rights

Henshall also states the convergency in society as the following:

- Telegraph started operating in 1869.
- Postal service in 1871.

[2]By Lockwood(1968)

- Western dress became fashionable, and in 1872 became required for some government employees.
- Western style haircut became fashionable.
- Western Solar Gregorian calendar was adopted in 1873.

These are the most significant ones among all changes. In addition to the above changes, Yoo and Steckel (2016) point out the importance of having property rights in the Meiji Era. Property rights provided people not only the title of their land but also the use of it. Yet, there was a registration process and its costs for having the title in hand. People started to pay these kinds of fees during that era, therefore transaction costs were created and grew over time.

During the Meiji Era, besides these changes in all society, there were also wars between Japan-Sino (1894-95) and Japan-Russo (1904-05). Canals (2015), writes these wars were important sources of higher economic growth. Even though there was westernization and improvements in industry in Japan, defense/war spending seemed to be another significant factor for economic growth.

Timetable of Major Developments in the Meiji Era:[3]

- Economy and society were westernized by western advisers' help in early 1870s.
- First railroad was built in 1870-72 by the small aid from British Loan, then improvements took place.
- Foreign trade increased significantly after 1868.
- Privatization by the government in early 1880s.
- Significant improvement in early 1890s.
- Sino-Japanese war-Japanese victories in 1894-95.

[3]Henshall (1999)

- Anglo-Japanese alliance in 1902.
- Russo-Japanese war-Japanese victories in 1904-1905.
- Japan annexes Korea in 1910.

To sum up, this dissertation does not aim to show how the western world influenced the Japanese economy and society; instead, it particularly exhibits how and where these transaction costs have been coming from. Starting from the end of the Tokugawa period and the Meiji Era, international trade volume increased as well as western influence. This can be seen in the last chapter of this study. These two main factors played a critical role in changes in institutions which caused higher transaction costs for the Japanese economy. However, the qualitative impact of changes in institutions is not discussed in this study. On the one hand, the economy has an increase in transaction costs as a quantitative impact. On the other hand, the economy easily integrates with the rest of the world which is out of scope for this dissertation.

Corporate Governance Perspective

Aoki (2000) simply defines the corporate governance in Japan as "the structure of rights and responsibilities among parties with a stake in the firm." He also points out the significant relationship between the corporate governance and financial and employment systems. Moreover, he states that the Japanese workers were the lifetime employees of a company, then they could become the company's stakeholders. In the corporate governance in the Anglo-American system, employees are simply outsiders. The main goal of this dissertation is not to explain what the corporate governance is in Japan, and the USA, however, its importance has a key role in institutional diversity and universality.

From the historical perspective to the modern period, the importance of institutions has been increasing. Field (1979) describes this importance as explaining the equilibrium of game in economy, therefore both institutions and technology need to be considered together. He also defines the institutions in any game model as being humanly devised rules in the form of implicit or explicit.

Therefore, historical as in the Meiji Era, and comparative as in the corporate governance structure, need to be complementary according to Greif (1998). He examines the historical and comparative institutional analysis and concludes that history is a key factor in explaining institutions in the way of emerging and evolving. Moreover, institutions are comparative in the way of attempting to gain insights, and finally, as in this dissertation and many other studies, institutions have analytic frameworks which provide empirical work opportunities. Greif also defines the institutions as non-technological constraints which shape economy and society. Apart from the above explanations and definitions, in Japan, institutions were created as a result of Western influence starting with international trade, and the costs of transaction emerged and evolved over time.

In the case of Japan after the Second World War, the banking system was working perfectly till 1975 according to Aoki. Then he explains the failure of *bureaupluralism* -which means Japanese workers are lifetime employees and shareholders of companies- during the 1980s to adopt the new global and technological environment. This not only caused additional institutional change and increases in transaction costs, but it also might have caused the generating of the bubble. In 1997, the Asian crisis first hit the four Asian countries, then it hit Japan's banking and financial system. This crisis is not the scope of this dissertation, however, because of it, the Anglo-American system was applied, and Aoki asks if this system works efficiently.

The neoclassical economics considers institutions as a substitute for the market maximizing of efficiency. However, many examples show the opposite according to Aoki. In his book (1999), he states how institutions, as in the property rights case, create the transaction costs. In addition to this, the Walrasian world says transaction costs are assumed to be zero. However, this is not the case since, as explained in the section 1.4, we have transaction costs during the exchange process which captures the gains. Aoki argues that if there is an increase in trade opportunities, improvement in technology and growth in population provide new insights to calculate the gains from exchanges. From his perspective, this dissertation aims to recalculate the gains from international trade as adding transaction costs to the equation. As explained above, the trigger factor of change in institutions is coming from international trade or exogenously given by the strong trade partner

as forcing the other partner to change its political and economic institutions, plus converging its society. Thus, the creation of transaction costs, as in the registration costs, has been emerging endogenously.

Furthermore, Aoki shows the weak points for unity of institutions across the world. He argues for the *Comparative Institutional Analysis* (CIA thereafter) as having a diversity in institutions which will provide benefits for countries. In other words, the gains from a basic exchange are not the net ones because an optimal organizational diversity in the trade partners needs to be determined, according to him. Aoki (1995) exhibits the path dependent organizational relation between the US and Japan during the last 50-60 years, which seems to prove the arguments above. He provides examples to clarify his arguments that in the micro-level firms try to find new and better ways to produce their products, and since each firm is unique, they can find unique ways. After that, those methods may be transferred to other firms. He also adds the importance of having an organizational diversity between the US, Japan, and China as in the Asia Pacific region, which provides the gains from free trade. However, the above examples are beyond this dissertation's purpose. They are only referenced to show the significance of having an organizational diversity or, in general, the diversity of institutions to understand and realize the gains from trade.

1.3.3 Impacts on Economy

Institutions have an impact on the economy by structuring the exchange and production, hence transaction costs start to play the most important role in this exchange according to North. Transaction costs are both measurable/observable as well as non-observable costs in the economy. Because of this fact, in literature, mainly qualitative measurements of institutions are playing roles. However, in this paper, the quantitative measurement of institutions will be calculated. As economists above state, the impact of institutions on the economy are causing increases in transaction costs. In the impersonal exchanges with institutional frameworks, this formalization captures the gains from trade.

1.4 Transaction Costs

Transaction costs are among most important in explaining institutions and institutional change. North and Wallis (1986) are the pioneers of calculating transaction costs in an economy in the literature. They first defined what transactions costs are, and what types they have in their work. In this dissertation, their way is followed in the calculation of transaction costs. Beside their work, in literature, we have some other ways - which are not that much different from theirs - to measure transaction costs.

According to *Walrasian world*, they assume that we have perfectly competitive markets so that an indivisible hand cares about supply and demand, therefore we do not have transaction costs. They count transaction costs as *zero*. Yet, in the real world, the importance of transaction costs is increasing. Since transaction costs are not zero anywhere in the world, the second step is showing how one can measure these costs. Williamson (1998) measures uncertainty, transaction frequency, asset specificity, and opportunism as being transaction costs.

1.4.1 Types of Transaction Costs

North and Wallis (1986) first define the transaction costs as the total value of resources used in transaction sectors under the national economy, then categorize its types. Soto (1989) also defines the missing parts from North and Wallis' works that show the non-marketed transaction costs, which are:

- Waiting time (includes paperwork and bureaucracy),
- Getting permits to do business,
- Cutting through red tapes,
- Bribing officials

These count as barriers or errors which one can't be measured when calculating the transaction costs. These errors will be defined in the methodology chapter.

North and Wallis (1986) define transaction costs included in both transaction industries and non-transaction industries. In transaction industries, these costs are:

- Finance,
- Insurance,
- Real Estate,
- Wholesale and retail trade - costs of exchanging and enforcing property rights.

In non-transaction industries, these costs include labor costs:

- Coordinating,
- Monitoring,
- Supervising.
- Policing.

Williamson (2010) points out the basics of transaction costs:

- Key conceptual moves - including human actions, adaptation and contract laws.
- Key operational moves - including analysis, governance and alignment.
- Applications - empirical, varieties and public policy.

1.4.2 As Quantitative Measurement of Institutional Change

In this part, North and Wallis's methods will be discussed regarding quantitative measurement of institutional change. They first categorize the economy as private and public, then state the types of transaction related sectors under each part. They have the following table that categorizes the whole economy:

Transaction and Non-transaction Sectors

Private		**Public**	
Non-Transaction	*Transaction*	*Non-Transaction*	*Transaction*
Agriculture	Finance	Education	Public Administration
Construction	Insurance	Health	Public Order
Mining	Real Estate	Rail/Air Transport	Defense
Manufacturing	Wholesale trade	Public Utilities	Postal Service
Transport/Storage	Retail Trade	Social Welfare	
		Communications	

Starting from their table, for calculating transaction costs, transaction and transactional related sectors will be addressed in this work. As defined earlier, the total value of resources used in these sectors is counted as transaction costs and these costs absorb the main part of national income according to literature which is given in the second chapter. Because of the increase in these costs, it reduces the net social welfare which is also stated by North and Wallis (1986). This proves why transaction costs have been so important beginning with the last half century.

1.5 Research Hypothesis

In the previous sections, international trade was discussed and how it impacted in the way economic and governmental institutional change is stressed. The relationship between international trade and institutional change is obvious and inescapable. The relationship is examined in this chapter and the next. The other focus is on how one can measure the effects of institutional change on the domestic economy. In the literature, the quality of institutions has mostly been measured with the rule of law index and government effectiveness by Acemoglu, Gallego, and Robinson (2014). Many others have also been trying to measure institutional quality and how it impacts the GDP, international trade and investments. However, the quantitative impact of institutional change

as a result of trade is a topic which has not been studied yet by economists. This dissertation fills that gap in literature in the way it calculates the net welfare from international trade. We come to this conclusion by using transaction costs which are created by institutional changes which result from trade. To sum up, in the first step of the whole analysis, trade occurs between countries, then the second step brings the convergence between countries as they trade. This convergence is deeply related to the bargaining power between countries, so that a country, which has more power than its trading partner, forces its trading partner to change its institutions. As evidenced by Japan, starting from the later Tokugawa period and early Meiji Era, western influence showed its impacts in Japan. In this dissertation, the institutional change is not discussed as good or bad or in a subjective way, but it is discussed as creating new costs to the economy which affects all households. The third step shows the transaction costs as being the impacts of institutional change. Rather than measuring the quality of institutions, the quantitative impact is examined.

Therefore, when these steps are brought together, the net outcomes will be shown by using welfare analysis for representative households. According to neoclassical trade theory, after trade we expect to have more consumption and more production (which is not the scope of this dissertation), hence, households should consume more than the previous year after trade. Thus, one can expect that trade will increase social welfare. However, in the effect of convergence and change in institutions, people have some extra costs which they have not had previously. Consequently, when examining these costs together with the gains from trade, the net welfare of trade for representative households will be different from what is calculated in the literature. In other words, assuming the monotonicity of utility function, an increase in consumption - which is an expected result from trade - leads to an increase in the utility level that raises welfare. Simultaneously, trade causes institutional change, and it creates transaction costs which result in a reduction in the net social welfare as stated by North and Wallis. Ultimately, the net benefits from trade are different than what has been calculated.

1.6 Structure of Dissertation

The structure of this dissertation is as follows. In Chapter 2, the literature review will be performed in three different subsections including *gains from trade, institutions and institutional change by trade*, and *transaction costs*. In Chapter 3, methodology and data will be examined. Under that chapter the quantitative methodology includes: first, calculating the gains from trade which are gross gains; second, measuring institutional change in the way of transaction costs; and finally, calculating net gains from trade. In Chapter 4, the outcomes will be expressed, tables and figures will be presented, and policy recommendations will be made. In the appendix, all needed calculations will be given.

1.7 Conclusion

In the first chapter, the main work of this dissertation was discussed. In this dissertation, there are three main parts: international trade (as benefits), institutions, and transaction costs - as being the effects of institutional changes. Furthermore, one of the key points is that one should be very careful when defining and categorizing transaction costs, since all transaction costs cannot be measured due to unobservable barriers. Thus, what is calculated for the transaction costs is the lower bounds of these costs. The other key points are both the historical path of institutional change as in the Meiji Era, and Comparative Institutional Analysis by Aoki. These points stress the main source and importance of institutional change with its impacts over the domestic economy. Besides these points, once benefits from trade for households are calculated, we expect to have more consumption expenditure. By bringing together these three parts, stated in the first sentence above, on the one hand, we have gains, on the other hand, we have some costs. When we subtract the latter from the former, we reach the net gains from trade. This is the main goal of this dissertation.

Chapter 2

Literature Review

2.1 Introduction

The preceding introductory chapter stated the assumptions in regard to gains from trade, institutional change and their spillover effect on the economy as transaction costs. According to North (1990) the term of convergence happens between countries, and it does not matter if either country is developed or developing. As countries trade goods and services, they gradually converge with each other. This convergence results in institutions being created or becoming more formal if countries are informal. Even though it is hard to measure institutional quality, one can measure its impact on the economy as transaction costs. In this dissertation, the institutional quality is not discussed, instead its impacts on the economy are discussed. This gives the objective picture of costs for changing institutions. In the first step of our calculation, trade occurs, and countries gain some benefits depending on their bargaining power. The second step represents the convergence according to the neoclassical international trade theory and builds on North's work. Finally, transaction costs absorb the national expenditure/income because of change in institutions. Therefore, on the one hand, we have some gains from trade which is calculated and accepted in the literature. On the other hand, we have some costs as transaction costs. This study brings these two sides together to calculate the net welfare gains as the result of trade for the representative households.

2.2 Gains From Trade

As highlighted in Section 1.2, there are several ways to have gains from trade. Countries trade in order to consume more, produce more, etc. However, these gains are not distributed evenly only between trading partners due to their bargaining power, but also between representative households in countries. In this section, gains from trade will be discussed from literature and these distinct points will be stressed.

Melitz and Redding (2014) calculate the welfare gains from trade via the gravity equation model. According to the authors, trade increases domestic productivity which leads to welfare gains. They stress the reorganization of production as a result of trade so that the representative households' welfare will increase. However, they do not show how this welfare will be distributed evenly among all representative households.

Arkolakis, Costinot and Clare's (2012) work is a kind of a pioneer attempt of Melitz and Redding's (2014) work. Arkolakis, etc. (2012) studies how big our gains are from trade. They make a connection between the effects of trade and welfare which are associated with domestic expenditure share and import elasticity. They link change in real income as a result of trade. One of the most important points in their paper is that they take care of different real possible cases such as perfect competition, monopolistic competition, free and restricted entry, heterogeneity, export costs and technological progress in order to explain these gains. Although they point out these different cases, they do not account for bargaining power between countries. These bargaining powers impact the gains from trade between countries, depending on how powerful the countries are.

The common points between these two different studies is that they calculate welfare gains by using aggregate data with one representative household. In this dissertation all points will be taken care of while calculating the gains from trade. In the real world, we do not have just one representative household, we have different income groups, and different countries which have different bargaining powers.

In another study, Burstein and Cravino (2012) link the welfare gains to between trade and aggregate measure of economic activity in the way of reducing variable trade costs. They point out that

reducing trade costs will increase the welfare gains, and as a result of reduction in these costs, trade patterns will be changed, and they will affect the aggregate economic activity including change in real GDP and real consumption. All papers which are discussed above show the welfare gains from trade in different perspectives. They are mainly related to each other as results, but they are different as methods. In addition to these works, in this paper a new way will be studied to explain the net gains from trade as welfare analysis of different representative households, which are distributing welfare gains between them, by establishing links between trade, institutional change and its impact on the economy as transaction costs.

As discussed above, some types of gains from trade are not the only ones we will have after trade. Sheu (2014) shows that we will have gains from trade if we have more varieties, better qualities and lower prices. Different from the above studies, and from this paper, Sheu studies industry level imports for computer printers in India, and finds that better quality is the most important source for welfare gains. If we consider again gains from trade, we realize that not only consuming or producing more are the sources of welfare gains, but also some countries may produce better and we can get a benefit from importing it. One of the main contributions of this dissertation does not state that benefits from trade are decreasing, but it is showing the differences if we resolve transaction costs which result from institutional change. In her study, lower price is also the second source of welfare gains and the third one is the varieties. As we can see from her work, better quality lead to more dependability so that people will use computer printers for a long time, which affects welfare positively as well as their utility.

Relationships between countries also plays a crucial role when we explain welfare gains from trade. Anderson and Wincoop (2001) investigate the borders effect on trade. According to them, less regulation and more integration will cause large potential welfare gains. Since all countries have different institutions, national borders will have an important impact on trade. Eaton and Kortum (2002) also stress the importance of reducing barriers which will lead to increases in technology and welfare gains. In both studies, they use a gravity equation to explain the borders' effect and find the negative relationship between borders and trade. Anderson and Wincoop sug-

gest less regulation which will decrease the convergence between countries, so they will incur less transaction costs. This is the point which is connected to this work. It is to be trading with countries without forcing them to change their institutions and without converging them with their own countries. Thus, people's welfare will be different from what is calculated if transaction costs are being resolved.

Eaton and Kortum show the technology gain and welfare gains in the manufacturing industry in some OECD countries. In their paper, they are trying to calculate benefits from trade in terms of geographic barriers and technology, which determine specialization. It can be seen how we have different ways to calculate benefits from trade in theory. In this work, the net gains from trade are the main purpose to be calculated for all representative households which are different income groups.

Starting from the points stated above, when countries trade with each other the interaction between them is unavoidable. In North's book (1990), according to Neoclassical International Trade Theory, countries would converge as they trade goods and services. This convergence will be not only between developed and developing countries, but also among industrialized countries. Therefore, change in institutions will be unavoidable so that its spillover effect on the economy as a transaction cost will affect everybody. In another study by him, with Joseph Wallis (1986), they state that an increase in the transaction costs reduces net social welfare. They found the relationship when they calculated the rise in the transaction costs in the US economy between 1870 and 1970. In Waugh's (2010) work one can see the income differences between countries as they trade. One of the critical points in his work is asymmetry as being a trade cost which is linked to bargaining power between both developed and developing countries, as well as among developed countries. In his paper, he makes the distinction between trade costs. For example, poor countries are facing higher costs to export relative to richer countries. This is related to transformation costs which is not the scope of this work. We are mainly addressing the transaction costs part which is one of the key scopes of this work. Waugh (2010) discusses the systematic asymmetry between countries that will cause countries to converge to more formal ones which leads to having more transaction

costs. In my work, formalizing institutions is not counted as good or bad means to connect with the rest of the world. Yet, the cost of changing institutions should be resolved in order to reach the net benefits from trade among countries.

As explained above, there are several ways to state trade costs, which include barriers, then geography as in Anderson & Wincoop and Eaton & Kortum's work, and then language similarities or differences and colonial relationship as in Cyrus (2014). Even though these transaction costs are not directly counted as trade cost, they are indirectly related and their impact on the domestic economy is important. When we come back to the work done by Waugh (2010), we see that trade frictions between rich and poor countries are stated. He stresses the importance of import share and of investigating the international income differences. In his work, he gives the example of trade shares between the US, Japan and Senegal. Since the US has more import share from Japan than Senegal, exporting costs in Japan are lower than in Senegal. This is coming from systematic asymmetries which is introduced by him. In his empirical work, when countries trade with each other in the OECD zone, the income differences are reduced by up to 23%. From the point of systematic asymmetry, if countries have equal market access, which is associated with bargaining power, the international income differences are reduced by up to 31%. When he brings these two concepts together, international income differences are reduced by up to 59% and 41%, respectively.

Reducing trade costs play a significant role in having more gains from trade. Transaction costs which are related to trade are also important while explaining welfare gains. Baeten and Butter (2006) show the empirical example for the Netherlands for reducing transaction costs which leads to an increase in welfare. In their paper, they focus on buying (outsourcing) without losing any jobs. Outsourcing is associated with transaction costs. As explained in the first chapter, transaction costs include searching for information, enforcement costs, bargaining, monitoring etc. These costs are linked both domestically and internationally when countries trade. Baeten and Butter (2006) state that reducing these costs by increasing knowledge and trust between countries will increase welfare gains. They suggest some ways including government intervention, but that causes domestic transaction costs and increasing trust by credit rating agencies, certification, common

database and reputations. They also point to the importance of specialization and that making outsourcing and trade innovations are important for reducing trade transaction costs.

Butter's work with Mosch (2003) shows the important point of reducing transaction cost by increasing trust between countries. In their work, the causal relationship between trade and trust level according to the World Value Survey (WVS hereafter) database, both formal and informal trust has a significant impact on bilateral trade volume, so countries trade more, but incur less transaction costs. According to them, legal similarities and cultural background, as stated by Cyrus (2014), play a crucial role by increasing trade flows as they expect. In their analysis, they take 15 European Union (EU, hereafter) countries, and state the cultural and legal similarities between them in order to explain the increase in trust. However, increase in trade flows between these countries is mainly coming from a lesser distance, using a common currency, and with legal similarities not mainly from trust. In literature, transaction costs are high in both developed and in developing members of EU countries. The reasons why they have high transaction costs are left for future research.

In literature, we have many important ways to increase welfare as well as decrease trade costs. In this work, calculating the benefits from trade, or welfare gains from trade, will be different from the literature. Although some economists take care of transaction costs, they only care about transaction costs during international exchange. International trade and convergence result in increases in transaction costs domestically, so it will negatively affect all people in those countries. Hence, net gains will be different from what is calculated so far in the literature.

2.3 Institutions and Institutional Change by Trade

In the preceding section, gains from trade ways were discussed, and as a result of trade there is a convergence between countries. One of the sources for change in institutions comes from international trade. As stated above, North (1990) points out that according to neoclassical international trade theory there will be convergence between countries after trade. This convergence happens in the way of changing or building up new institutions. In this section, the relationship between trade and institutions and an historical way of convergence will be discussed.

Do and Levchenko (2009) discuss the trade and institutional quality relationship in their paper. According to them, after trade, small elite groups (larger firms) in the country want to have institutional quality low in order to keep most of the exports, and therefore profits, in their hands. Thus, smaller firms will have a barrier, institution, to entering the market. The importance of economic institutions, including quality of contract enforcement, property rights, rule of law of index, etc., has been increasing to explain economic performance in countries. Acemoglu, Robinson, and Johnson (2005) stated the idea of economic performance and institutional quality relations. Do and Levchenko (2009) make the political equilibrium modeling in order to compare the institutional quality between trade and autarky case. After trade openings, small elite groups make the entry costs high so that smaller firms cannot operate, therefore these elite groups make all the profits. Even though institutional quality and profits by firms are not the scope of this dissertation, the idea of trade opening and its effects on institutions are the key point to bridge the gap between trade and change in institutions. This point proves that there is a convergence between countries after trade so that one can see the change in institutions and measure their impacts on the economy which is the idea of this paper.

In another of Levchenko's (2013) study, he stresses the importance of trade and change in the institutional quality in his work. In his paper, trade partners are forced to change the quality of their institutions after opening. This change in institutional quality will be positive, unlike the previous case. Hence, improvement in the institutional quality impacts the economy positively. In his previous work with Do (2009), he notes that without having better institutions, some rent-seeking parties would capture all rents. In the work (2013), the main idea is having the better institutional qualities by countries so that no rent-seeking parties could capture rents, and therefore, countries will have a political economy equilibrium case. These studies show the significant relationship between trade and institutions, but they are also stating the difficulties of measuring institutional quality due to the lack of data. This dissertation is separate from measuring institution quality. According to literature, it is historically proven that trade causes institutional change, and this change is not free. Even though it is hard to measure institutional quality, one can measure its impacts on

the economy via transaction costs channels which will be discussed thoroughly in the next section. Since institutional quality plays a key role in explaining economic performance, Dollar and Kray (2002) empirically state that trade, institutional quality and growth go in the same direction in the long run. In their work, one can see that better institutions help countries trade more. This is the first analysis in their work which shows the positive and significant relationship between them. The second analysis in their study is that to see the years effected, they apply dynamic regression and conclude that trade and institutional quality are coming from both historical and geographical backgrounds. Their findings are statistically significant in that both trade-institutional quality and growth, especially in the long-run, have a positive relationship. All in all, it can be realized that one cannot separate trade and its effect on institutional change in countries. The quality of institutions is not the topic of this work, however, to make a connection between trade and institutions, it will provide the opportunity to calculate the impacts of institutions domestically.

In one case, North, D.C. (1990) is the one who first attempted to explain the historical convergence after countries trade goods and services. As countries converge on each other, there will be divergence between societies from the past to the future which proves the change in societies. In his book, transaction costs are taken care of as the result of change in institutions. According to neoclassical international trade theory, there will be convergence between countries as they exchange goods and services. This convergence happens both in developed nations, for example between Japan and the USA, and between developing and developed nations, as developed nations force the developing nations to change their institutions after they start to trade. These forces are coming from countries' bargaining power which is the other proof of why trade affects institutions. Trade happens due to the differences of relative prices. Also, countries have bargaining powers. North (1990) determines that these two points are crucial sources of institutional change. He also states the importance of transaction costs as a measurement of the institutions, and he stresses transaction costs as the most observable dimension of the institutional frame. From his point, calculating transaction costs as the measurement of institutional change will give the results of why institutional change is not free lunch.

2.4 Transaction Costs

The connection between trade and institutional change is obvious. Starting from this connection, to finalize all relationships for calculating the net welfare from trade, the measurement of transaction costs is playing a significant role. Even though one cannot measure all the transaction costs in the economy, what is calculated will be the lower level of transaction costs, which is explained in the next chapter.

According to Meramveliotakis and Milonakis (2010), standard neoclassical theory assumes that transaction costs are zero, but the new institutionalist perspective, starting with North, counts transaction costs as among the most important explanatory variables of institutional change. In their paper, transaction costs are divided into three important parts including market transaction costs, supervisory transaction costs, and property rights transaction costs. They also point out that there is the objectivist, which is a quantitative measurement, and the subjectivist, which is a qualitative measurement. All are discussed in the first chapter. In this section the importance of transaction costs will be discussed as the result of change in institutions. In Wallis and North's (1994) work, the importance of transaction costs in the economic activities are stressed in the way of productivity and growth. They state that increases in transaction costs may play a negative role in economic growth.

When we go back in history, Coase, R.H. (1937) is the one who first discussed the institutions during economic activity. He makes a connection between two assumptions in economic theory, such that resources are allocated by price mechanisms, so no institutional arrangement is necessary, which is the neoclassical world, and the resource allocation is dependent on the coordinators. Even though we assume no uncertainty, yet we have uncertainty.

Ronald Coase (1988, p. 6) states the importance of transaction costs that *Without the concept of transaction costs, which is largely absent from current economic theory, it is my contention that it is impossible to understand the working of the economic system, to analyze many of its problems*

in a useful way, or to have a basis for determining policy.

Starting from Ronald Coase, right now we have two significant questions: "What are transaction costs?" and "How can one measure them?" Wang (2003) shows the ways of measuring transaction costs from literature. In his paper, he states that transaction costs include the cost of price mechanism, by Coase, as being the margin between what the consumer pays and what the producer receives, according to Niehan (1987), and the cost of negotiation and enforcement according to Williamson, and, finally, and most importantly in this work, the transaction costs are measured as the value of resources used in transacting sectors according to North-Wallis (1986). In this dissertation, transaction costs will be calculated for Japan by following North-Wallis's way, then taking them as costs to the equation to calculate net welfare from trade.

In their pioneer work, Wallis and North (1986) calculated the transaction costs for the US economy from 1870 to 1970. They are the pioneer economists who measured these costs for an economy. In their empiric paper, they state the importance of transaction costs during an exchange. Also, they define transaction costs as capturing gains from trade since cost of information is not free lunch. What they find is that in the US economy almost 47% of GNP was devoted to transacting in 1970, increasing from 24% in 1870. If we take care of the government expenditure on transaction services and pay salaries for government employees in transactional related jobs, almost 55% of GNP was devoted to transacting in 1970, increasing from 26% in 1870. From their pioneer work, it can be seen that transaction costs are capturing gains from national income. They also state in their paper, increases in transaction cost reduces net social welfare. Hence, the importance of transaction costs seems obvious. As following on their work, Dollery and Leong (1998) calculated the transaction cost for the Australian economy between 1911 and 1991 and found that the value of resources consumed in both private and public transacting sectors increased from 32% to 59% of GDP. When we bring these two papers together, at least for the same periods, the large and increasing proportion of national expenditure is absorbed by transaction costs.

In New Zealand, Tim Hazledine (2001) modified the Wallis-North way and investigated the ratio of transaction to transformation sectors between 1956 to 1996 and concluded that the ratio increased

from .36 $\rightarrow$ .86 if he takes care of unemployment, otherwise the ratio increased from .36 $\rightarrow$ .68. In the Bulgarian and Polish economies, one can see similar results that Chobanov and Egbert (2007) measured for the transaction cost in the Bulgarian economy for the years 1997-2003 and found that the share of transacting sectors in GDP increased from 37% to 52%. For the Polish economy, Suleyewicz and Grace (2005) also followed Wallis-North's way and concluded there was an increase in transaction sectors for the years between 1996-2002. They found that the ratio of total transaction services to the GDP increased from 49.7% to 67.25%.

All these studies and others, which are not discussed here, show the increasing importance of transaction costs for the economies. The reasons behind them vary such as modernization, converging to formal countries, forcing other countries to change their institutions because of trade, etc. It depends on the country's case. The ways of calculating transaction costs varies, but the frame is clear. As discussed in the previous chapter, transaction costs mainly include finance, insurance, wholesale and retail trade, banking sector or, in general, service sectors under a national account. These costs absorb the big part of national expenditure so that it will cause cost increases for all people then decrease in net social welfare which is calculated in the next chapter.

2.5 Conclusion

According to the literature discussed above, calculating gains from trade is obvious. Welfare gains from international trade are calculated as aggregated, including increases in real income, increases in domestic expenditure, lowering of prices, including qualities, etc. Change in institutions is coming from either modernization or converging with another country through trade. Hence, trade plays a crucial role in how nations experience changes in their institutions. Trade particularly affects the quality of institutions however this is not the scope of this study. This dissertation examines the cost side of institutional change. Transaction costs are becoming one of the most important parts of international economics and institutional economics. In North's book (1990), he states that the effects of the institutional change are a *"mixed bag"* which includes both positive affects by protecting contracts, property rights, reducing uncertainty, etc., and negative impacts

such as causing a rise in transaction costs which absorb the national income from representative households. To sum up, all three important steps which were explained in the previous chapter will be examined and will present the net gains from international trade considering the cost side of the institutional change via transaction costs.

Chapter 3

Methodology and Data

3.1 Introduction

In the preceding chapters, the theoretical background of the study was discussed, and methods of calculations gains from trade were discussed. In this work, in order to calculate net welfare analysis for representative households, all things are brought together on the same page and conclude the net welfare analysis. Heckscher (1919) states that *numeraire* should be chosen as the unit of measure. Change in people's expenditures provides the change in their utilities. How do they have changes in their utilities as trade volumes changes? To answer this question in this chapter, gross gains will be calculated from trade. Transaction costs will be calculated as the impacts of institutional change, and finally the difference will be called net gains from trade.

North (1990) states that if net gains will be formulated,

$NG = \Delta C - \Delta TC - errors$[1] and $NG = \Delta L^i - \Delta TC - errors$ [2]

for years $T = t, t+1, t+2, \cdots, t+n$

and $i = lowest,\ secondlowest,\ middle,\ secondhighest,\ highest\ income$

[1] Look at below

[2] As discussed above, there could be some errors since all transaction costs can not be observed and so measured. Therefore, what we have as transaction costs, they are lower bounds in our linear model.

Details are provided in the next sections.

3.2 The Quantitative Methodology

In this section, the source of data and the results for calculations will be given. To get the most balanced database, there could be some time intervals. The aim of the work is to calculate the net gains from trade. In this work, not only one representative household's welfare is taken into account, but also more than one representative households' - which are different income groups - welfare are considered to have the most efficient results. This is another key point of this paper that fills another gap in the literature.

3.2.1 Calculating Gains from Trade

In the neoclassical world, we expect to have more consumption as we trade more and more. In this section, calculating gross gains is discussed.

For the years $T = t, t+1, t+2, \cdots, t+n$, trade volume is provided and in order to eliminate trend effects the difference between years will be taken and the average change will be calculated between time intervals. The formulation is:

All trade equations below represent the change between years. Here all calculations are based on per-person terms.

- $Trade\ Volume\ (Tr) = EX + IM \quad (1)$
- $\Delta Tr = Tr_{t+1} - Tr_t \quad (2)$
- $Avg_{tr} = (\frac{Tr_{t+n}}{Tr_t})^{\frac{1}{n}} - 1 \quad (3)$

- $Tr^{GDP} = Trade\ share\ of\ GDP$

- $\Delta Tr^{GDP} = Tr_{t+1}^{GDP} - Tr_t^{GDP}$ (4)
- $Avg_{Tr}^{GDP} = (\frac{Tr_{t+n}^{GDP}}{Tr_t^{GDP}})^{\frac{1}{n}} - 1$ (5)

- $Ex = Exports$ and $Im = Imports$
- $\Delta Ex = Ex_{t+1} - Ex_t$ (6)
- $Avg_{Ex} = (\frac{Ex_{t+n}}{Ex_t})^{\frac{1}{n}} - 1$ (7)

- $\Delta Im = Im_{t+1} - Im_t$ (8)
- $Avg_{Im} = (\frac{Im_{t+n}}{Im_t})^{\frac{1}{n}} - 1$ (9)

From equation 1 to 9, in total trade volume, as stated above, in the following years the differences are taken into account. And the average growth rate of trade volume is considered to eliminate trend effects. The same procedure is applied for the trade share of GDP, exports and imports. From this point, we can see how these changes impact representative households' consumption expenditure.

- $C = Consumption\ Expenditure$ which represents all households if we consider all representative households to be identical. Here all calculations are based in per-person terms, and to eliminate trend affects, de-trending is applied.
- $\Delta C = C_{t+1} - C_t$ (10) represents the change in consumption expenditure between years.
- $Avg_C = (\frac{C_{t+n}}{C_t})^{\frac{1}{n}} - 1$ (11)

If we consider different income groups including:
$\ell_1 = lowest\ \ell_2 = secondlowest\ \ell_3 = middle\ \ell_4 = secondhighest\ \ell_5 = highest$
so that we have 5 different income groups. Since all income groups have different average and marginal consumption expenditures, results from gains from trade are considered separately.

- $L = Living\ Expenditure$ which represents the living expenditures in these different income groups. All equations below represent the change in consumption expenditure between years. All calculations are based on per-person terms. To eliminate trend affects, de-trending is applied for living expenditures in different representative households.

- Moreover, each different income group has a different number of per-persons in households, so these differences are taken into account.

- $\Delta L^{\ell_1} = L_{t+1}^{\ell_1} - L_t^{\ell_1}$ (12)

- $Avg_{L^{\ell_1}} = (\frac{L_{t+n}^{\ell_1}}{L_t^{\ell_1}})^{\frac{1}{n}} - 1$ (13)

- $\Delta L^{\ell_2} = L_{t+1}^{\ell_2} - L_t^{\ell_2}$ (14)

- $Avg_{L^{\ell_2}} = (\frac{L_{t+n}^{\ell_2}}{L_t^{\ell_2}})^{\frac{1}{n}} - 1$ (15)

- $\Delta L^{\ell_3} = L_{t+1}^{\ell_3} - L_t^{\ell_3}$ (16)

- $Avg_{L^{\ell_3}} = (\frac{L_{t+n}^{\ell_3}}{L_t^{\ell_3}})^{\frac{1}{n}} - 1$ (17)

- $\Delta L^{\ell_4} = L_{t+1}^{\ell_4} - L_t^{\ell_4}$ (18)

- $Avg_{L^{\ell_4}} = (\frac{L_{t+n}^{\ell_4}}{L_t^{\ell_4}})^{\frac{1}{n}} - 1$ (19)

- $\Delta L^{\ell_5} = L_{t+1}^{\ell_5} - L_t^{\ell_5}$ (20)

- $Avg_{L^{\ell_5}} = (\frac{L_{t+n}^{\ell_5}}{L_t^{\ell_5}})^{\frac{1}{n}} - 1$ (21)

From equation 10 to 21, changes and average in consumption expenditure for all households and different income groups will be calculated to see the effects of trade volume on consumption expenditure.

3.2.2 Measuring the Institutional Change by Transaction Costs

In this part, the quantitative measurement of institutional change will be calculated for the same selected years as done in the previous section in order to have balanced data. Since transaction costs are the key elements in measuring institutional impacts on the economy, public, private and total transaction costs will be considered in calculations. To be consistent, de-trending methods are also applied in measuring both public and private transaction costs.

- $Total\ Transaction\ Costs = Public\ Transaction\ Costs + Private\ Transaction\ Costs$ which represents the total transaction costs for the years $T = t, t+1, t+2, \cdots, t+n$
- $\Delta G^{tc} = G^{tc}_{t+1} - G^{tc}_{t}$ (22) represents the change in public transaction costs between years.
- $Avg_{G^{tc}} = (\frac{G^{tc}_{t+n}}{G^{tc}_{t}})^{\frac{1}{n}} - 1$ (23)
- $\Delta P^{tc} = P^{tc}_{t+1} - P^{tc}_{t}$ (24) represents the change in private transaction costs between years.
- $Avg_{P^{tc}} = (\frac{P^{tc}_{t+n}}{P^{tc}_{t}})^{\frac{1}{n}} - 1$ (25)
- $G^{tc}_{GDP} = (\frac{G^{tc}_{t}}{GDP_t})$ (26) represents the share of public transaction costs in GDP.
- $Avg^{G^{tc}}_{GDP} = (\frac{G^{tcGDP}_{t+n}}{G^{tcGDP}_{t}})^{\frac{1}{n}} - 1$ (27)
- $P^{tc}_{GDP} = (\frac{P^{tc}_{t}}{GDP_t})$ (28) represents the share of private transaction costs in GDP.
- $Avg^{P^{tc}}_{GDP} = (\frac{P^{tcGDP}_{t+n}}{P^{tcGDP}_{t}})^{\frac{1}{n}} - 1$ (29)

3.2.3 Calculating the Net Gains from Trade in Japan

Gross gains will be calculated from given equations above for Japanese households by assuming all representative households are both identical and different. For the transaction costs, I assume that all people are identical, since everybody incurs the same costs as a result of institutional change. Therefore, after de-trending in each variable, I take the difference between gross gains per person and total transaction costs per person to obtain the net gains from trade.

Finally, net gains will be:

$$Net\ Gains = \underbrace{\Delta C}_{GrossGains} - \underbrace{(\Delta G^{tc} + \Delta P^{tc})}_{TotalTransactionCosts} - errors$$

$\Longrightarrow$ by assuming all representative households are identical. For each individual year.

$$Net\ Gains = \underbrace{\Delta L^{i}}_{GrossGains} - \underbrace{(\Delta G^{tc} + \Delta P^{tc})}_{TotalTransactionCosts} - errors$$

$\Longrightarrow$ by assuming we have different income groups as $i = \ell_1, \ell_2, \ell_3, \ell_4, \ell_5$. For each individual year.

3.3 Data Used in the Study

To get the most balanced database, sources from the Japanese Statistical Agency were used, including:

- Economic and Social Research Institute, Cabinet Office, Government of Japan.
- Statistical Survey Department, Statistics Bureau, Ministry of Internal Affairs and Communications.
- Department of National Accounts, Economic and Social Research Institute, Cabinet Office.
- Historical Statistics of Japan

World Wealth and Income databases, and International Historical Statistics are used. From these sources the following were used: national accounts, trade volumes, family expenditures, transaction costs, input-output tables, income distributions, and population information. Detail addresses are given in the references section.

3.3.1 Descriptive Statistics

Here all variables used in the analysis are explained. There are two different periods which are called the historical and modern period.

1. **Historical Period 1885-1940**

   - *National Account*
     - Gross national product is used till 1930, then gross domestic product.
     - At current prices in yen.
   - *Consumption Expenditure* includes;
     - Food, housing, medical care, transportation-communication, education, cultural-social recreation, miscellaneous.
     - At current prices in yen
     - Estimates by Ohkawa, Takamatsu, and Yamamato.
   - *Transaction Costs* includes mainly public transaction costs due to lack of private transaction costs. Service sectors covers public, domestic and professional services, and public administration. At current prices in yen.
   - *Trade Volume* includes export and import at current prices in yen.

2. **Modern Period 1955-2014**

   - *National Account*
     - Gross Domestic Expenditure.
     - At current prices in yen
   - *Living Expenditure* for worker's households in all cities from 1955-2003 then it includes agricultural and other households. As explained above, each different income group has a different number of persons.
     - Food, housing, medical care, transportation-communication, education, cultural-social recreation, miscellaneous.
     - At current prices in yen.

- *Transaction Costs* here is divided between public and private transaction costs. As explained in section 1.4.2, transaction costs include:
  - Finance/Insurance, Real Estate, Whole sale/retail trade are counted as private transaction costs.
  - Public services and public administration are counted as public transaction costs.
  - At current prices in yen.
- *Trade Volume* includes exports and imports at current prices in yen.

3.4 Conclusion

In this chapter, the previous theoretical idea is brought together on the same page. In Japan, starting from the Meiji Era, because of trade, institutional change has been occurring and the impacts on the economy have been significantly increasing. It will be inescapable to measure the real/net benefits from trade, as taken care of transaction costs under the same linear equation. From these calculations, different net gains will be seen in the next chapter.

Chapter 4

Policy Implications and Conclusions

4.1 Introduction

Types of gains from trade are discussed in section 1.2.2. Change or an increase in consumption expenditure is one of the main purposes of international trade. People trade to consume more, produce more, etc. As shown in *Figure 4.1*, trade plays a vital role in Japan's national account. Japan's trade share on its national account increased from 6-7% in the 1880s to peak level which was more than 40% then finally around 25% in the 1940s. Therefore, it is expected to have an increase in consumption expenditure. Assuming the monotonicity of utility functions, an increase in consumption expenditure will lead to an increase in utility level and finally a rise in social welfare. As in *Table 4.2* and *Figure 4.3*, increased gross gains can be seen. However, transaction costs should not be forgotten. Starting from the Meiji Era, which was explained in detail in section 1.3, an increase in trade volume and the impacts of Western influences led to a change in institutions in Japan. Hence, transaction costs were created. When the transaction costs are added to the equations for calculations, different net gains are obtained as in the *Table 4.2* and *Figure 4.3*. According to North and Wallis, an increase in transaction costs reduces net social welfare. The opposite is also true in this relationship which means that a decrease in transaction costs raises net social welfare. We see this fact clearly after the 1997 Asian crisis, where there was almost a consistent decline in total transaction costs, and therefore, in the modern period, the decrease in

net gains isn't seen till the mid-1990s. Then there was an increase in net gains after the late 1990s which is also seen in *Figure 4.7, 4.8, and 4.9*. To sum up, this dissertation proves that the net gains will be different if transaction costs, which are the quantitative impacts of institutional change, are included in the calculations.

4.2 Outcomes

In this section, outcomes are discussed in two different periods. The first period, which is called the historical period, covers the years between 1885 and 1940, and the second period, which is called the modern period, covers the years between 1955 and 2014. As explained in section 3.3, these are the years to obtain the balanced data sets for each variable which is used in the analysis. Also, there is a cut point between 1940 and 1955 due to the Second World War. Tables and figures are shown below. Moreover, the appendix section includes:

- Gross gains for each individual year (as change between years) for both identical households, and different household groups.
- Total transaction costs change between years.
- Share of total transaction costs are also given per-year as private and public for the modern period, and only as total in the historical period.

4.2.1 The Historical Period Outcomes

The period includes the years from 1885 to 1940. Tables and figures are shown below. It can be easily seen that trade volume, including exports and imports per-person and trade share as percentage, increased over the years as in *Table 4.1* and *Figure 4.1 and 4.2*.

Thus, as shown in *Table 4.2* and *Figure 4.3* transaction costs are increasing because of changes in institutions. These changes in institutions are coming from international trade. Therefore, the conclusion is that there is a decrease in net social welfare which proves North and Wallis.

As in *Table 4.3* and *Figure 4.4*, tthe only different point is that the share of total transaction costs seems to have a decreasing trend in the historical period. Japan had a higher growth rate of national income due to the increase in war/defense expenditures than the transaction costs. However, the growth rate of transaction costs is still high.

Table 1	**g* (Avg. growth rate of detrend)**	**1885-1939**	
Trade Volume (Ex+Im)	Trade Share of National Income	Export	Import
6.009%	.62%	8.46%	4.24%

Table 4.1: Trade Volume-Historical Period

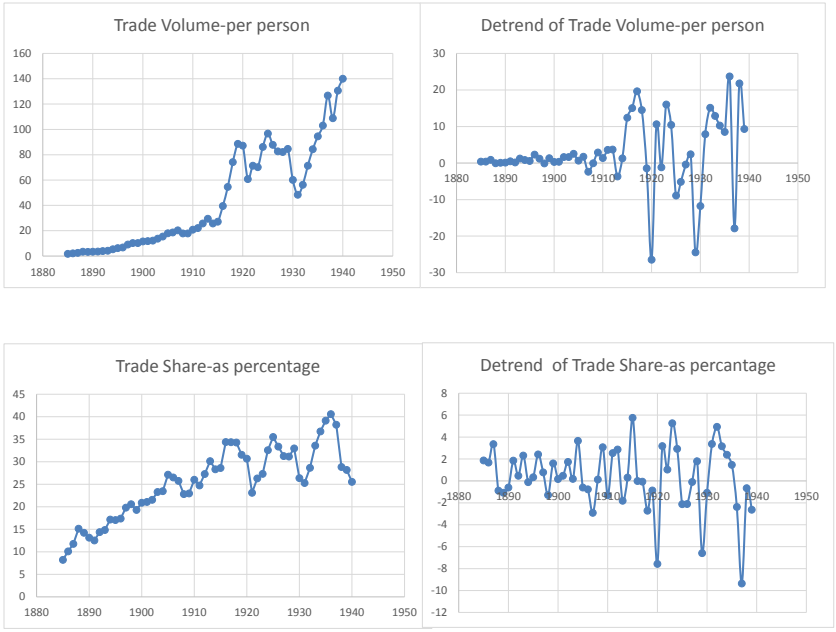

Figure 4.1: Total Trade Volumes-Historical Period

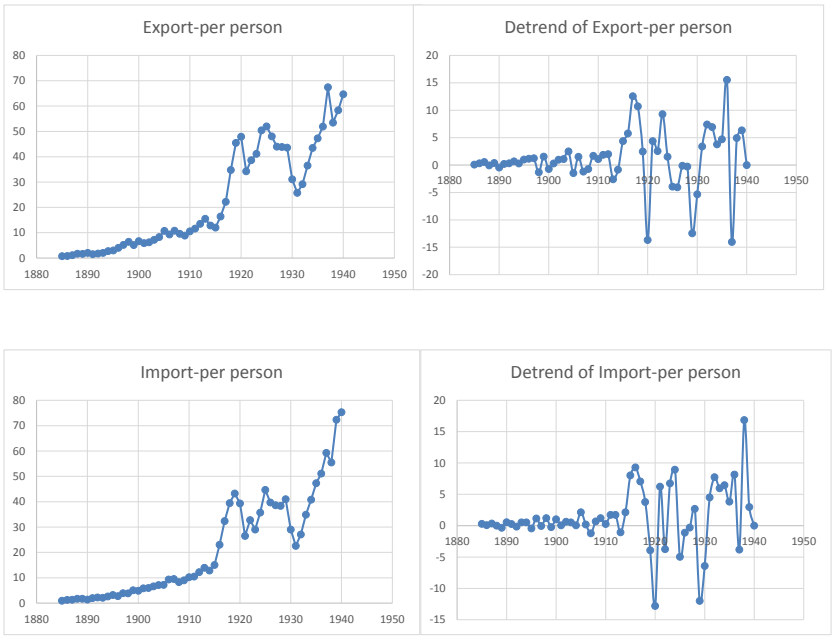

Figure 4.2: Exports and Imports per person-Historical Period

Table 2	**g* (Avg. growth rate of detrend)**	**1885-1939**
Gross Gains	Total Transaction Costs	Net Gains
7.54%	20.34%	4.86%

Table 4.2: Gross Gains-Transaction Costs-Net Gains in Historical Period

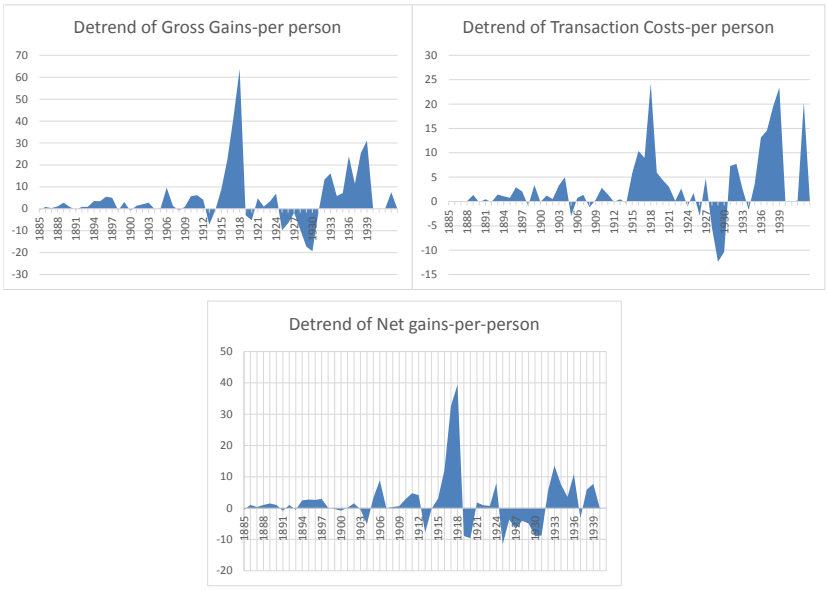

Figure 4.3: Gross and Net Gains per person-Historical Period

Table 3	**g (Average growth rate) 1885-1940**
GNP-GDP	Transaction Costs
7.2%	6.6%

Table 4.3: National Accounts and Transaction Costs

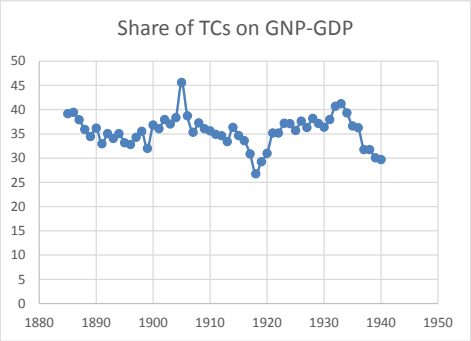

Figure 4.4: Transaction Costs-Historical Period

4.2.2 The Modern Period Outcomes

The modern period includes the years from 1955 to 2014. Tables and figure are shown below. Here *Table 4.4* and *Figure 4.5 and 4.6* show that trade volume, including exports and imports per-person and trade share as percentage, increased over years.

Hence, as shown in *Table 4.5* and *Figure 4.7, 4.8, and 4.9* there is a rise in the gross gains which are coming mainly from increases in trade volume. There is also another increase in the transaction costs which are coming from change mainly in institutions, then the conclusion is that the net gains are decreasing in the years if transaction costs are increasing. Also, the net gains are increasing if transaction costs are decreasing.

Table 4.6, and 4.7 and *Figure 4.10* provide the growth rate of public and private transaction costs so that total transaction costs and national income can be seen. Therefore, the share of transaction costs has been increasing over the years in the modern period even though there's a decline after the 2000s due to the Asian crisis and the recent 2007-2008 crisis.

Table 4	**g* (Average growth rate of detrend)**	**1955-2014**	
Trade Volume (Ex+Im)	Trade Share of National Income	Export	Import
5.8%	0.27%	6%	5.64%

Table 4.4: Trade Volume-Modern Period

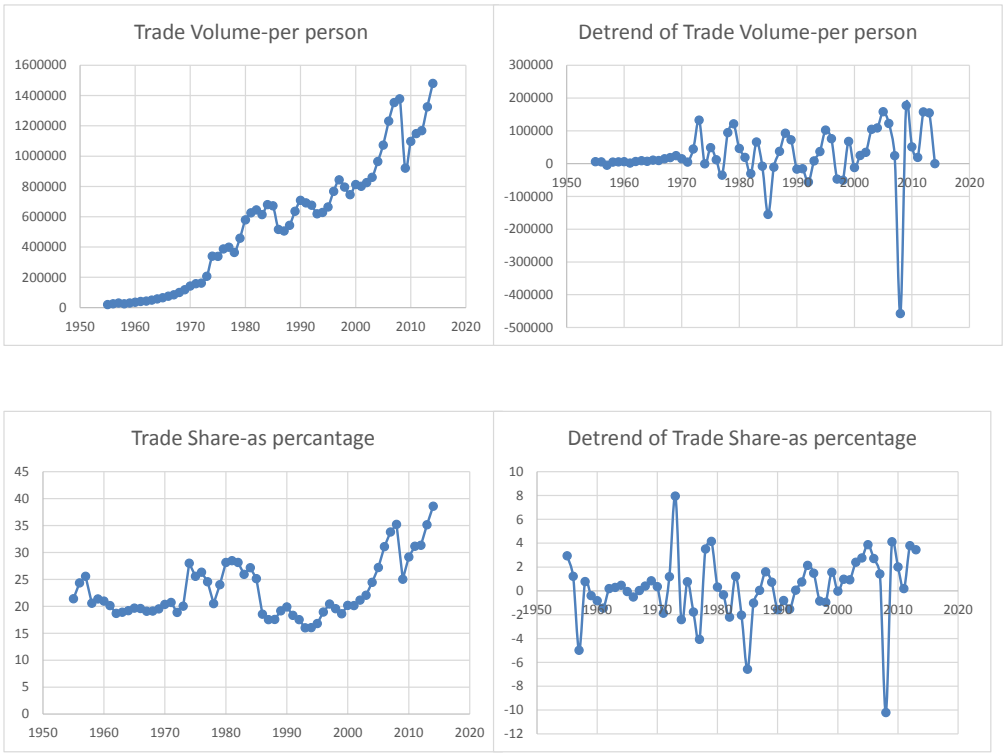

Figure 4.5: Total Trade Volume-Modern Period

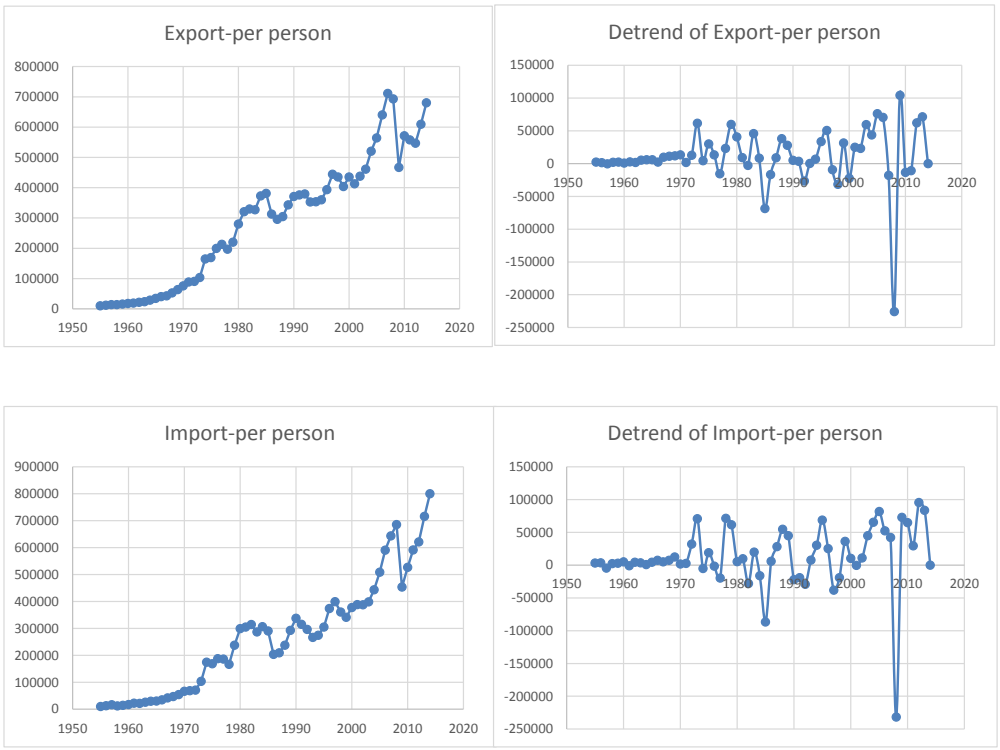

Figure 4.6: Export and Import per person-Modern Period

Table 5	**g*(Avg. growth rate of detrend of gross gains)**		**1955-2014**	**Per-person**
Lowest	Second Lowest	Middle	Second Highest	Highest
5.59%	4.66%	3.12%	2.41%	6.55%

Table 4.5: Gross Gains per person in Modern Period

Avg. growth rate of detrend of total transaction costs is 1.85%. Due to the crises in the last 2 decades, the growth rate is lower than the historical period.

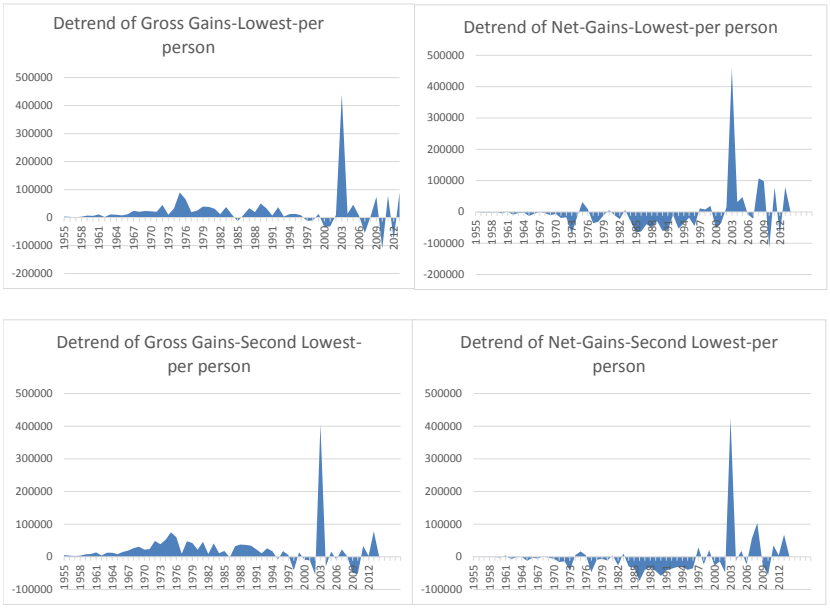

Figure 4.7: Gross and Net Gains per representative households-Modern Period

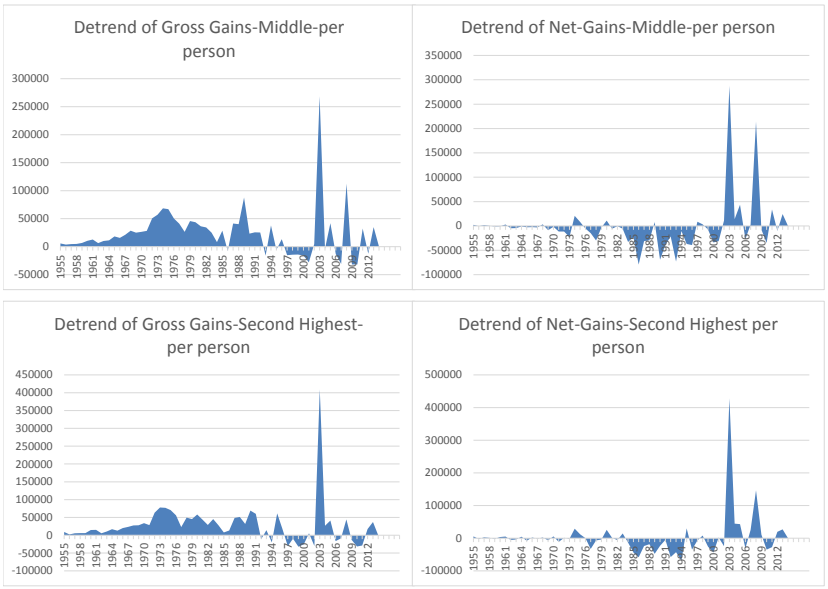

Figure 4.8: Gross and Net Gains per representative households-Modern Period

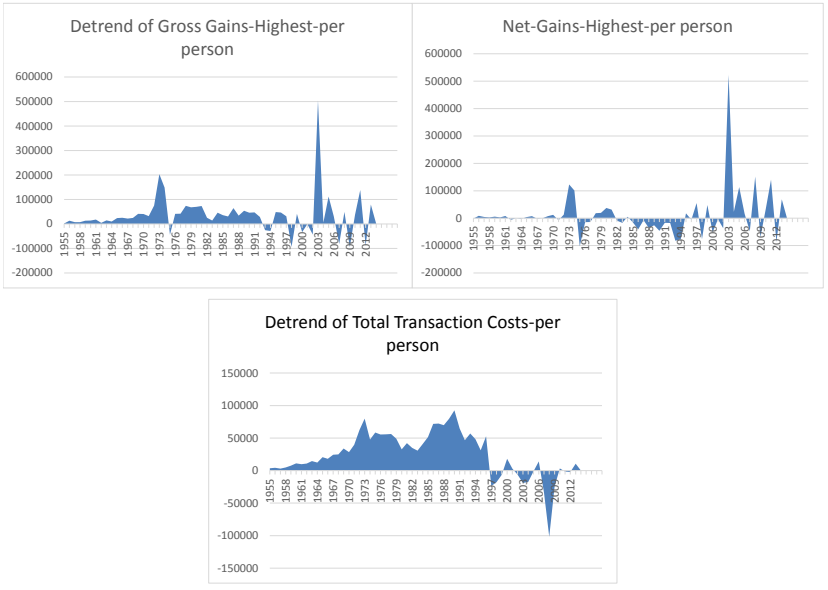

Figure 4.9: Gross and Net Gains per representative households-Modern Period

Table 6	**g (Averega growth rate)**	**1955-2014 per-person**
Private Transaction Costs	Public Transaction Costs	Total Transaction costs
7.091%	6.59%	6.97%

Table 4.6: Public and Private Transaction Costs

Table 7	**g (Averega growth rate)**	**1955-2014**
Gross Domestic Expenditure	Total Transaction Costs	
7%	7.58%	

Table 4.7: Expenditure and transaction costs

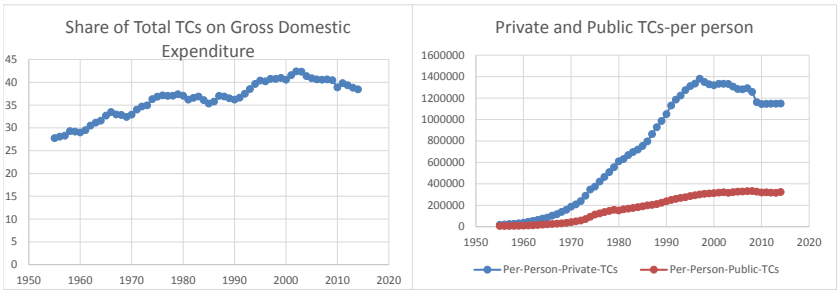

Figure 4.10: Transaction Costs-Modern Period

4.3 Policy Implication and Conclusion

Countries trade to obtain some benefits. In the literature we have several important benefits including more consumption, more production, better quality, more varieties, lower prices, etc. This dissertation is aimed to calculate the net benefits from international trade as evidenced by Japan. According to neoclassical international trade theory, countries would gradually converge with each other as they trade goods and services. In Japan, starting from the late decades of the Tokugawa period and mainly the early years of the Meiji Period, the volume of trade had risen between Japan and the Western World. As a result of trade, Western influences in Japan caused a change in institutions. These changes happened not only in government and economic organizations, but they also happened in the society. As stated above, the theory states the convergence between countries as they trade. Therefore, new institutional environments and their quantitative impacts as transaction costs were created. When one looks at the simple national income data he/she would see a rise in trade volume, and a rise in consumption expenditure over years. However, this dissertation eliminates the trend affects as it takes the differences between each following year to show the gross gains for each individual year. This is the first step to calculate the net gains from trade. In the second step, as pointed out above, countries would gradually converge with each other, change their institutions, especially forcing the trade partner to change its institutions, for the purpose of unity. This would create transaction costs which is the last step. Hence, all people would incur these transaction costs. North and Wallis state a vital point that an increase in transaction costs causes a decrease in net social welfare. This dissertation brings these points together to show that changes in transaction costs affect the net social welfare. Therefore, in both cases the net benefits would be different. To sum up, this dissertation proves the crucial ideas. Firstly, the neoclassical international trade theory is bringing convergency. Secondly, the new institutional analysis by North is pointing out the importance and impacts of institutions. Finally, the comparative institutional analysis by Aoki is pointing out the diversity gains across the world or at least no gains would be realized as having unity in the world. As shown in the above tables and figures, the conclusion and proof of the above ideas is that trade provides an increase in consumption expenditure and

causes changes in institutions. The economic impacts of institutions are quantitatively measured by transaction costs in this dissertation, so that trade indirectly causes a rise in transaction costs via changes in institutions. Therefore, the net gain would be different than what has been calculated so far. These results also prove the monotonicity of utility functions. Finally, this dissertation does not aim to say changes in institutions are bad, unnecessary or have negative impacts. However, while one is calculating the net benefits from trade, the trade and institutional change relationship are needed to be counted in the analysis to obtain the most efficient and correct results.

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Appendix A

Appendix

This section includes; gross gains for each individual year (as change between years) for both identical households, and different household groups, total transaction costs change between years, share of total transaction costs are also given per-year as private and public for the modern period, and only as total in the historical period.

Table A-1 Detrend of Per-Person Variables

Years	Gross Gains	Transaction Costs	Net Gains
1885	-0.570991074	-0.000882441	-0.570108633
1886	0.88244075	-0.137193583	1.019634333
1887	0.337403816	0.015650346	0.32175347
1888	1.0720474	0.060286855	1.011760545
1889	2.814969534	1.311133792	1.503835742
1890	0.839552317	-0.171268673	1.01082099
1891	-0.370390728	0.46644539	-0.836836118
1892	0.855800194	-0.15698524	1.012785434
1893	0.916014764	1.438472005	-0.522457241
1894	3.546621264	1.07446183	2.472159434
1895	3.47615859	0.75282321	2.72333538
1896	5.566551256	2.914312714	2.652238542
1897	5.025016683	2.069158903	2.95585778
1898	-0.770047225	-0.921889249	0.151842024
1899	3.108542544	3.378821876	-0.270279332
1900	-0.864530672	-0.08478991	-0.779740761
1901	1.336929735	1.226815835	0.1101139
1902	2.048911484	0.493570403	1.55534108
1903	2.791894316	3.254632094	-0.462737779
1904	-0.101845176	4.993109247	-5.094954424
1905	0.288600786	-2.99488903	3.283489816
1906	9.625878156	0.736359729	8.889518427
1907	1.349548261	1.352678404	-0.003130143
1908	-0.811774657	-1.173125217	0.36135056
1909	1.009094362	0.331944597	0.677149765
1910	5.771147333	2.813231322	2.95791601
1911	6.209950348	1.460853155	4.749097193
1912	4.100214949	-0.067764083	4.167979033
1913	-7.323005119	0.461594707	-7.784599826
1914	-0.535639194	-0.307893513	-0.227745681
1915	8.972650477	5.851115815	3.121534662
1916	22.5282144	10.3647829	12.1634315
1917	41.642539	8.938003111	32.70453589
1918	63.67712051	24.24363353	39.43348698
1919	-2.983970664	5.903224571	-8.887195235
1920	-5.24610443	4.345549605	-9.591654035
1921	4.813946121	3.004512996	1.809433125
1922	1.011326986	0.114275366	0.89705162
1923	3.386050257	2.665924116	0.720126141
1924	6.919222014	-1.011304496	7.93052651
1925	-9.797685771	1.744103819	-11.54178959
1926	-6.56491176	-2.959813507	-3.605098252
1927	-1.842057757	4.746916239	-6.588973997
1928	-9.406170625	-5.364280366	-4.041890259

Table A-1 Detrend of Per-Person Variables

Years	Gross Gains	Transaction Costs	Net Gains
1929	-17.3097766	-12.3914423	-4.918334306
1930	-19.33369982	-10.36518488	-8.968514936
1931	-1.438819546	7.296327042	-8.735146588
1932	13.32779857	7.738960831	5.588837739
1933	16.18949499	2.608359535	13.58113546
1934	5.828511678	-1.724903628	7.553415306
1935	7.169582049	3.580906257	3.588675792
1936	23.99707406	13.16516281	10.83191126
1937	11.39234349	14.56385487	-3.171511378
1938	25.45879655	19.53283158	5.925964977
1939	31.12939726	23.36563913	7.763758125
1940	0	0	0

Table A-2 Detrend of	Per-Person	Variables	in Different	Income	Groups					
Years	GG-L	NG-L	GG-SL	NG-SL	GG-M	NG-M	GG-SH	NG-SH	GG-H	NG-H	Total TCs
1955	3605.33	67.18	5286.51	1748.35	5698.69	2160.54	9148.10	5609.95	1869.41263	-1668.738	3538.151
1956	2511.48	-1899.33	3497.82	-912.99	3857.94	-552.87	2196.96	-2213.85	13176.27481	8765.47	4410.805
1957	1478.00	-1535.32	2430.68	-582.65	4680.20	1666.87	5487.44	2474.12	7213.160273	4199.833	3013.327
1958	2888.94	-1810.99	3818.43	-881.51	5015.86	315.93	6035.97	1336.04	7589.57529	2889.641	4699.934
1959	7128.25	-562.05	7478.67	-211.63	6749.01	-941.30	5902.49	-1787.82	13155.88571	5465.581	7690.305
1960	6203.32	-5002.23	8721.37	-2484.19	10518.81	-686.75	14700.36	3494.80	13885.09405	2679.537	11205.56
1961	11421.34	1675.95	13720.71	3975.33	12646.73	2901.35	14964.49	5219.11	17752.96697	8007.585	9745.382
1962	1994.28	-8955.41	3938.26	-7011.43	6270.26	-4679.43	5363.76	-5585.93	4472.033898	-6477.659	10949.69
1963	11299.73	-3276.69	12806.85	-1769.57	10079.41	-4497.01	10758.44	-3817.98	14426.41667	-149.9995	14576.42
1964	10337.05	-1914.98	12559.37	307.33	11319.49	-932.55	17022.78	4770.74	9779.647033	-2472.389	12252.04
1965	7523.06	-13200.47	8101.20	-12622.33	18154.52	-2569.02	12982.92	-7740.62	24394.87296	3671.338	20723.54
1966	11938.92	-6060.15	15273.33	-2725.73	15534.65	-2464.41	20281.62	2282.56	25345.58668	7346.523	17999.06
1967	24259.91	-188.90	19094.56	-5354.25	21218.67	-3230.14	23164.80	-1284.01	22219.88128	-2228.927	24448.81
1968	20644.10	-4357.79	26499.75	1497.86	28446.42	3444.53	27286.62	2284.73	24617.00438	-384.8875	25001.89
1969	23540.22	-10402.79	31073.39	-2869.62	25016.13	-8926.88	27783.00	-6160.02	41559.32763	7616.317	33943.01
1970	22103.94	-6183.05	22160.39	-6126.60	26530.25	-1756.73	33926.19	5639.20	40731.80958	12444.82	28286.99
1971	20255.36	-19385.47	23716.62	-15924.22	28176.79	-11464.05	28375.55	-11265.29	32103.21255	-7537.626	39640.84
1972	45172.38	-17057.43	48360.60	-13869.21	50725.17	-11504.64	63201.68	971.87	75085.58212	12855.77	62229.81
1973	10317.54	-69603.65	38353.98	-41567.21	57002.82	-22918.36	78050.05	-1871.14	203148.7323	123227.5	79921.19
1974	32574.16	-15080.09	52066.22	4411.98	68409.05	20754.81	76957.56	29303.32	148789.4339	101135.2	47654.25
1975	90034.99	31526.36	74904.96	16396.33	66950.82	8442.19	70504.65	11996.02	-43950.4993	-102459.1	58508.63
1976	64691.55	9119.35	60297.64	4725.44	50268.67	-5303.53	55872.92	300.73	41272.66676	-14299.53	55572.2
1977	19497.77	-36257.67	9117.53	-46637.90	40939.38	-14816.05	22795.36	-32960.08	41950.30291	-13805.13	55755.44
1978	24714.29	-31604.23	47520.89	-8797.63	26475.29	-29843.23	49647.76	-6670.76	74287.66096	17969.14	56318.52
1979	39039.94	-9923.56	42659.24	-6304.26	45785.09	-3178.42	45143.93	-3819.58	68201.51815	19238.01	48963.51
1980	38035.46	5426.01	21521.85	-11087.60	43714.33	11104.87	58296.05	25686.59	69783.64476	37174.19	32609.46
1981	31395.92	-10742.34	46282.62	4144.36	36305.80	-5832.46	43326.89	1188.63	73669.17293	31530.91	42138.26
1982	12023.97	-22880.69	8684.07	-26220.59	34375.74	-528.91	28844.38	-6060.28	25641.87857	-9262.78	34904.66
1983	37385.68	6718.70	40931.07	10264.09	25020.78	-5646.19	45345.63	14678.65	13760.92373	-16906.05	30666.98
1984	11424.18	-29551.70	10909.25	-30066.62	8136.11	-32839.76	27430.16	-13545.72	46059.23151	5083.356	40975.88
1985	-13159.61	-64673.53	18201.27	-33312.65	28370.98	-23142.94	7596.37	-43917.55	35880.3726	-15633.55	51513.92
1986	8920.82	-62847.37	-1659.70	-73427.90	-7535.75	-79303.94	13507.07	-58261.12	30743.92443	-41024.27	71768.19

Table A-2	Detrend of	Per-Person	Variables	in Different	Income	Groups					
1987	33145.98	-39168.54	32458.59	-39855.92	41237.94	-31076.57	48584.54	-23729.98	64976.95	-7337.57	72314.52
1988	19253.39	-50427.11	37806.28	-31874.21	40189.76	-29490.74	51422.68	-18257.82	34374.48	-35306	69680.5
1989	50335.64	-29201.34	36382.97	-43154.00	87598.29	8061.31	31469.43	-48067.55	53876.16	-25660.8	79536.98
1990	32013.25	-60590.15	34064.20	-58539.20	23304.40	-69299.00	68984.88	-23618.52	46163.87	-46439.5	92603.4
1991	7266.08	-57390.36	22763.29	-41893.14	25612.31	-39044.13	59776.83	-4879.61	47398.59	-17257.9	64656.44
1992	37039.66	-9692.53	10462.67	-36269.52	25233.82	-21498.37	-11104.54	-57836.73	28967.3	-17764.9	46732.19
1993	3628.57	-53468.64	25899.96	-31197.25	-16011.39	-73108.59	14274.47	-42822.73	-25401.5	-82498.7	57097.21
1994	12223.02	-35968.54	17275.75	-30915.80	37743.88	-10447.67	-20107.77	-68299.33	-28327.5	-76519	48191.55
1995	13153.23	-18103.08	-8545.24	-39801.55	-5640.06	-36896.37	61306.16	30049.85	48773.41	17517.1	31256.31
1996	7802.95	-44871.01	17612.54	-35061.42	13273.06	-39400.90	17787.50	-34886.46	46993.81	-5680.15	52673.96
1997	-12347.39	11568.62	4952.75	28868.76	-15260.63	8655.39	-30673.61	-6757.59	31192.72	55108.73	-23916
1998	-10153.55	7638.56	-41246.04	-23453.92	-14469.61	3322.50	-9582.58	8209.53	-94035.2	-76243.1	-17792.1
1999	12843.87	19375.22	13870.28	20401.63	-13932.79	-7401.44	-32179.12	-25647.77	41429.7	47961.05	-6531.35
2000	-34154.49	-52250.71	-9013.85	-27110.07	-15865.49	-33961.71	-25865.93	-43962.16	-33408.5	-51504.7	18096.23
2001	-31275.26	-34302.60	-10797.31	-13824.65	-28023.23	-31050.57	5355.61	2328.27	-603.058	-3630.4	3027.338
2002	8606.71	14881.60	-54529.79	-48254.89	4745.06	11019.95	-30455.17	-24180.28	-43086.3	-36811.4	-6274.89
2003	439707.73	458786.70	405519.10	424598.06	268484.64	287563.60	408942.50	428021.46	503595.5	522674.4	-19079
2004	13372.30	31011.57	-29312.26	-11672.98	-3756.45	13882.82	26737.65	44376.92	5431.588	23070.86	-17639.3
2005	45891.39	47442.70	16331.33	17882.64	41847.69	43399.00	41342.61	42893.92	111746.6	113297.9	-1551.31
2006	6053.69	-7984.90	-8775.97	-22814.56	-13172.08	-27210.68	-16708.91	-30747.51	30524.3	16485.71	14038.59
2007	-55298.72	-21337.76	22815.38	56776.34	-30896.25	3064.71	-8588.64	25372.32	-81828.4	-47867.4	-33961
2008	5660.72	107403.14	1782.73	103525.15	112350.81	214093.23	44546.71	146289.13	49590.7	151333.1	-101742
2009	74212.89	98430.40	-48791.56	-24574.04	-31692.72	-7475.21	-12903.97	11313.55	-94064.3	-69846.8	-24217.5
2010	-111276.57	-114507.37	-52506.27	-55737.06	-31792.01	-35022.81	-31772.48	-35003.28	37617.09	34386.29	3230.795
2011	77872.49	79355.51	33382.26	34865.28	32344.53	33827.55	-28745.55	-27262.53	138541.1	140024.1	-1483.02
2012	-78384.22	-76139.25	2530.57	4775.54	-12468.30	-10223.33	17320.48	19565.46	-88834.5	-86589.5	-2244.98
2013	89670.37	79201.55	77927.09	67458.27	34987.03	24518.21	37310.49	26841.67	79161.6	68692.78	10468.82
2014	0	0	0	0	0	0	0	0	0	0	0

Table A-3 Share of Total Transaction Costs on National Income

Years	GNPandGDP(millions)	Ad+Ser	Share on GNP-GDP
1885	806	315641000	39.16141439
1886	800	315607000	39.450875
1887	818	310321000	37.93655257
1888	866	310924000	35.9034642
1889	955	329249000	34.47633508
1890	1056	382347000	36.20710227
1891	1139	375411000	32.95970149
1892	1125	394301000	35.04897778
1893	1197	407849000	34.07259816
1894	1338	469093000	35.05926756
1895	1552	514839000	33.17261598
1896	1666	546891000	32.82659064
1897	1957	670970000	34.28564129
1898	2194	780236000	35.56226071
1899	2314	740600000	32.00518583
1900	2414	889460000	36.84589892
1901	2484	896085000	36.07427536
1902	2537	963469000	37.97670477
1903	2696	998420000	37.03338279
1904	3028	1161484000	38.35812417
1905	3084	1406473000	45.6054799
1906	3302	1278210000	38.71017565
1907	3743	1323397000	35.35658563
1908	3766	1403601000	37.27033988
1909	3780	1363877000	36.08140212
1910	3925	1397900000	35.61528662
1911	4463	1557131000	34.88978266
1912	4774	1653662000	34.63891915
1913	5013	1673988000	33.39293836
1914	4738	1721958000	36.34356268
1915	4991	1729309000	34.64854739
1916	6145	2066710000	33.63238405
1917	8592	2652445000	30.87110102
1918	11839	3171346000	26.78727933
1919	15453	4522579000	29.26667314
1920	15896	4929368000	31.01011575
1921	14886	5237535000	35.18430069
1922	15573	5476882000	35.16908752
1923	14924	5553094000	37.20915304
1924	15576	5782382000	37.12366461
1925	16265	5806531000	35.69954504
1926	15975	6010060000	37.62165884
1927	16293	5918393000	36.3247591
1928	16506	6305369000	38.2004665

Table A-3	Share of Total Transaction	Costs on	National Income
1929	16286	6052181000	37.16186295
1930	14698	5347872000	36.38503198
1931	12520	4752956000	37.96290735
1932	13043	5308622000	40.7009277
1933	14334	5910224000	41.23220315
1934	15672	6165265000	39.3393632
1935	16734	6131100000	36.63858014
1936	17800	6458308000	36.28262921
1937	23426	7435693000	31.74119781
1938	26793	8510237000	31.76291195
1939	33083	9948472000	30.0712511
1940	39396	11706306000	29.71445324

Table A-4	Share of Private and Public	Transactions Costs	on National Income	
Years	Gross-Domestic-Exp (billions)	Share of TotalTCs	Share of PrivateTCs	Share of PublicTCS
1955	8399.1	27.74702051	20.21883297	7.528187544
1956	9446.8	28.07299826	20.926663	7.146335267
1957	10874.2	28.28070111	21.55193026	6.728770852
1958	11545.4	29.27746115	22.45049977	6.826961387
1959	13188.6	29.17519676	22.61346921	6.561727553
1960	15998	29.01612702	22.75721965	6.258907363
1961	19306.6	29.51218754	23.4526017	6.059585841
1962	21900.8	30.49842928	24.18267826	6.315751023
1963	25054.6	31.13480159	24.53800899	6.596792605
1964	29446.1	31.58482787	25.04032792	6.544499951
1965	32772.8	32.67953913	25.82904116	6.850497974
1966	38073.3	33.47148789	26.77913393	6.692353959
1967	44626.1	32.93229747	26.48315672	6.449140749
1968	52825.1	32.82587255	26.5809246	6.244947951
1969	62065.9	32.40120582	26.27449211	6.126713703
1970	73188.4	32.90179865	26.71297637	6.188822272
1971	80591.9	34.01297153	27.38947711	6.623494421
1972	92400.8	34.70002424	27.89456368	6.805460559
1973	112519.5	34.92932336	28.01301108	6.916312284
1974	133996.8	36.32071811	28.64113173	7.679586378
1975	148169.9	36.85276159	28.25668371	8.596077881
1976	166416.9	37.12639762	28.63483216	8.49156546
1977	185530.1	37.03663179	28.59115583	8.445475963
1978	204474.5	37.04789595	28.74412213	8.30377382
1979	221824.5	37.38532038	29.12446551	8.260854865
1980	240969.2	37.06183197	29.65412177	7.407710197
1981	259034	36.20941652	28.7907379	7.418678629
1982	271887.8	36.57935369	29.17159211	7.407761584
1983	282803.3	36.88217217	29.49629654	7.385875625
1984	300940.8	36.10823125	28.80107981	7.30715144
1985	323541.2	35.32672191	28.19742895	7.129292962

Table A-4	Share of Private and Public	Transactions Costs	on National Income	
1986	338674	35.76908768	28.62558094	7.143507
1987	352530	37.01528948	29.96150682	7.053783
1988	379250.4	36.89024455	30.04940799	6.840837
1989	408534.7	36.47565311	29.73590738	6.739746
1990	440124.8	36.20300424	29.51556013	6.687444
1991	468234.4	36.61888148	29.98431982	6.634562
1992	480492.1	37.49491407	30.74458456	6.75033
1993	484233.8	38.52174301	31.58513511	6.936608
1994	490005.2	39.62729375	32.56551155	7.061782
1995	496922.2	40.38861617	33.16841147	7.220205
1996	509983.9	40.21613231	32.95898165	7.257151
1997	520939.1	40.7392342	33.44709583	7.292138
1998	514595.2	40.75665688	33.2040019	7.552655
1999	507224.1	40.96838064	33.21074452	7.757636
2000	511462.3	40.54988999	32.7553761	7.794514
2001	505847.1	41.58145811	33.58109595	8.000362
2002	497896.8	42.37934447	34.15300118	8.226343
2003	497485	42.32256249	34.1794426	8.14312
2004	503725	41.34472182	33.16716462	8.177557
2005	503903	40.87671635	32.56678369	8.309933
2006	506687	40.65527633	32.34857022	8.306706
2007	512975	40.54875969	32.26570496	8.283055
2008	501209	40.64930997	32.11913593	8.530174
2009	471139	40.4613076	31.55692906	8.904379
2010	482384	38.88292315	30.3983963	8.484527
2011	471311	39.80386624	31.08457049	8.719296
2012	475110	39.3580434	30.80002526	8.558018
2013	480128	38.82089776	30.43750833	8.383389
2014	486939	38.44588337	29.97767688	8.468206